

WHAT IS CLAIMED IS:

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1. An operator assisting apparatus for assisting an operator of an electric-component supply device including a plurality of component feeders and feeder support on which the component feeders are mounted at respective feeder-mounting positions, each of said component feeders accommodating a plurality of electric components of a specific kind and being arranged to successively supply the electric components one after another, said operator assisting apparatus being arranged to assist the operator in performing at least one manual working operation selected from among an operation to mount the component feeders on said feeder support, an operation to remove the component feeders from said feeder support, and an intermediate operation to be performed in connection with the component feeders, during a time period between moments of the operations to mount and remove the component feeders on and from the feeder support, said operator assisting apparatus comprising:

at least one of (a) a position indicator operable to indicate at least one of the feeder-mounting position at which a corresponding one of the component feeders is to be mounted next on said feeder support and the feeder-mounting position at which a corresponding one of the component feeders has been removed last from said feeder support, and (b) a feeder indicator operable to indicate at least one of (i) the component feeder which has been mounted last on said feeder support, (ii) the component

feeder which is to be removed next from said feeder support and (iii) the component feeder on which said intermediate operation is required to be performed.

3. 2. An operator assisting apparatus according to claim 1, which comprises said position indicator, to assist the operator in performing said operation to mount the component feeders on said feeder support.

4. 3. An operator assisting apparatus according to claim 1, further comprising a mounting-position checking and indicating device for effecting a determination as to whether the component feeder mounted last on said feeder support has been mounted at a correct one of said feeder-mounting positions, and for indicating in a human recognizable manner a result of said determination.

5. 4. An operator assisting apparatus according to claim 3, which comprises said feeder indicator, and wherein said mounting-position checking and indicating device utilizes said feeder indicator, to indicate said result of said determination.

6. 5. An operator assisting apparatus according to claim 4, wherein said mounting-position checking and indicating device is operable to control said feeder indicator to be operable in a first manner upon a first determination that

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said component feeder mounted last on said feeder support has been mounted at said correct feeder-mounting position, and a second manner different from said first manner, upon a second determination that the component feeder mounted last on said feeder support has not been mounted at said correct feeder-mounting position.

6. An operator assisting apparatus according to claim 1, which comprises said feeder indicator, to assist the operator in performing said operation to remove the component feeders from said feeder support.

7. An operator assisting apparatus according to claim 1, which comprises said position indicator, and further comprises a removing-position checking and indicating device operable to control said position indicator to be operable in a third mode upon a third determination that said component feeder removed last from said feeder support has been removed from a correct one of said feeder-mounting positions, and in a fourth mode different from said third mode, upon a fourth determination that the component feeder removed last from said feeder support has not been removed from said correct feeder-mounting position.

8. An operator assisting apparatus according to claim 1, which comprises said feeder indicator, to assist the operator in performing said intermediate operation.

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9. An operator assisting apparatus according to claim 1, which comprises said feeder indicator, and further comprises:

a need detecting device operable to detect a need of performing said intermediate operation;

an operation detecting device operable to detect that said intermediate operation has been performed in connection with any one of said component feeders; and

an intermediate-operation checking and indicating device operable according to an output of said need detecting device, to control said feeder indicator for indicating the component feeder in connection with which said intermediate operation has been performed, such that said feeder indicator is operable in a fifth mode upon a fifth determination that said intermediate operation has been performed at a correct one of said feeder-mounting positions, and a sixth mode different from said fifth mode, upon a sixth determination that said intermediate operation has not been performed at said correct feeder-mounting position.

10. An operator assisting apparatus according to claim 1, which comprises said feeder indicator, and further comprises:

a need detecting device operable to detect a need of performing said intermediate operation;

an operation detecting device operable to detect that said intermediate operation has been performed in connection with

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any one of said component feeders; and

an intermediate operation checking and indicating device operable according to an output of said need detecting device, to control said feeder indicator to be operable in a seventh mode upon a seventh determination that the intermediate operation which has been performed has been performed is said intermediate operation the need of which has been detected by said need detecting device, and in an eighth mode different from said seventh mode, upon an eighth determination that the intermediate operation which has been performed is different from said intermediate operation the need of which has been detected by said need detecting device.

11. An operator assisting apparatus according to claim 1, further comprising next-operation determining means for determining the manual working operation which should be performed next by the operator, and the component feeder for which the determined manual working operation should be performed next, said manual working operation being one of the operation to mount any one of said component feeders on said feeder support, the operation to remove any one of said component feeders from said feeder support, and said intermediate operation in connection with any one of said component feeders.

12. An operator assisting apparatus according to claim 11, wherein said next-operation determining

means includes need detecting means for detecting a need of performing at least one of said operation to mount any one of said component feeders at the corresponding feeder-mounting position, said operation to remove any one of said component feeders mounted at the corresponding feeder-mounting position, and said intermediate operation in connection with any one of said component feeders.

13. An operator assisting apparatus according to claim 11, wherein said plurality of component feeders are provided with respective sets of feeder-identification data identifying the component feeders, respectively, and said next-operation determining means includes:

feeder-identification-data obtaining means for obtaining said sets of feeder-identification data of said component feeders; and

operation-data storing means for storing operation data indicative of the manual working operation to be performed by the operator in connection with the component feeder whose set of feeder-identification data has been obtained by said feeder-identification-data obtaining means,

and wherein said next-operation determining means determines the manual working operation represented by said operation data stored in said operation-data storing means, as said manual working operation which should be performed next in connection with the component feeder whose set of feeder-identification data has been obtained by said

feeder-identification-data obtaining means.

14. An operator assisting apparatus according to claim 11, wherein said feeder support is provided with sets of position-identification data representative of said plurality of feeder-mounting positions, respectively, and said next-operation determining means includes:

position-identification-data obtaining means for obtaining said sets of position-identification data of said feeder-mounting positions; and

operation-data storing means for storing operation data indicative of the manual working operation to be performed by the operator at the feeder-mounting position represented by the set of position-identification data obtained by said position-identification-data obtaining means,

and wherein said next-operation determining means determines the manual working operation represented by said operation data stored in said operation-data storing means, as said manual working operation which should be performed next at the feeder-mounting position represented by the set of position-identification data obtained by said position-identification-data obtaining means.

15. An operator assisting apparatus according to claim 1, wherein at least one of said position indicator and said feeder indicator includes optical indicator for indicating the feeder-mounting position or the component feeder,

by generation of a light.

A, 16. An operator assisting apparatus according to claim 15, wherein said optical indicator includes at least one of an irradiating device operable to irradiate an object with a light, and a light-emitting device disposed on an object and operable to emit a light.

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